

[ABSTRACT]

[SUMMARY]

The present invention relates to an optical disc reproduction method, which may omit the still mode operation of displaying the DVD title menu picture in the case where the type of the optical disc to be currently reproduced is a DVD-series disc when the all disc repeat play is performed with respect to the plural optical discs seated in the multi-disc changer or an instant reproduction operation is performed in a general optical disc player, select and reproduce any one of A/V data of the main title recorded in the DVD, and select and reproduce any one of A/V data of the title corresponding to a move or music to instantly reproduce and output it, thus making it possible to effectively prevent the instant play operation or the all disc repeat play operation requested by the user from being temporarily stopped owing to a menu screen display.

[REPRESENTATIVE DRAWING]

Fig. 3

[REPRESENTATIVE WORDS]

multi-disc changer, dvd player, all disc repeat play, instant reproduction, still mode, slot

[SPECIFICATION]

[TITLE OF INVENTION]

OPTICAL DISC REPRODUCTION METHOD

[BRIEF DESCRIPTION OF DRAWINGS]

Fig. 1 is a view schematically illustrating a construction of a general multi-disc changer,

Fig. 2 is a view illustrating an exemplary DVD title menu picture displayed at a still mode in a general multi-disc changer,

Fig. 3 is a flowchart illustrating an optical disc reproduction method according to the present invention,

Fig. 4 is a view illustrating an exemplary main title of a DVD selected and reproduced by an optical disc reproduction method according to the present invention,

Fig. 5 is a view illustrating a construction of a general DVD player to which an optical disc reproduction method according to the present invention applies, and

Figs. 6 to 8 are views illustrating navigation information used for an optical disc reproduction method according to the present invention.

<DESCRIPTIONS OF KEY ELEMENTS IN DRAWINGS>

10: multi-tray

20: servo system

30: optical pickup

40: VDP system

101, 102, 103, and 104: slots

[DETAILED DESCRIPTION OF INVENTION]

[OBJECT OF INVENTION]

[TECHNICAL FIELD AND BACKGROUND OF INVENTION]

The present invention relates to a method for reproducing an optical disc, which successively or repeatedly plays all optical discs seated respectively in slots of a multi-disc changer capable of loading a plurality of optical discs therein at the same time, or instantly plays an optical disc loaded in a general optical disc apparatus, such as a digital versatile disc (DVD).

Fig. 1 is a block diagram schematically showing the construction of a general multi-disc changer.

As shown in Fig. 1, the general multi-disc changer comprises a multi-tray 10 including a plurality of slots 101, 102, 103 and 104 for seating a plurality of optical discs therein at the same time, respectively, and a servo system 20 for rotating the multi-tray 10 and the optical discs seated respectively in the slots 101, 102, 103 and 104 thereof.

The multi-disc changer further comprises an optical pickup 30 for reading signals recorded on the optical discs seated respectively in the slots 101, 102, 103 and 104, and a video disc player (VDP) system 40 for processing the signals read by the optical pickup 30.

The VDP system 40 is adapted to, if a user selects a desired one of the optical discs in the slots 101 ~ 104 of the multi-tray 10 and requests playback of the selected disc, identify a number of the slot corresponding to the selected optical disc and then controls the servo system 20 to rotate the selected optical disc to a position readable by the optical pickup 30.

The VDP system 40 then processes a radio frequency (RF) signal read by the optical pickup 30 and outputs the resulting signal to an external device connected thereto, such as a television set or audio set. As a result, the user can select and play a desired one of the plurality of optical discs loaded in the multi-disc changer.

The VDP system 40 is also adapted to, if the user requests an 'all disc repeat play operation', controls the servo system 20 to sequentially reproduce the optical discs in the slots while sequentially rotating the slots.

As a result, the user can sequentially and repeatedly play all the optical discs loaded in the multi-disc changer in a simple and convenient manner.

However, a compact disc (CD)-series disc has a characteristic of being reproducible just after its recognition, but a DVD-series optical disc has a characteristic of being reproducible only after a DVD title menu picture as shown in Fig. 2 is outputted and displayed

in a still mode with reference to initially read navigation information and a user selects and requests playback of a desired title displayed in the DVD title menu picture. For this reason, the general multi-disc changer has a disadvantage in that the all disc repeat play operation requested by the user cannot be successively performed in the case where a DVD-series optical disc is seated in any one slot of the multi-disc changer.

Similarly, an optical disc apparatus, such as a general DVD player, outputs and displays a DVD title menu picture as shown in Fig. 2 in the still mode with reference to initially read navigation information in the case where a DVD-series optical disc is loaded therein. For this reason, a user has the inconvenience of having to select a desired title and request playback of the selected title.

[TECHNICAL PROBLEMS TO BE SOLVED BY INVENTION]

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide an optical disc reproduction method, which is capable of, when an all-disc repeat play operation is performed with respect to a plurality of optical discs loaded in the multi-disc changer or when an instant play operation is performed in a general optical disc player, omitting a still mode operation of outputting and displaying a DVD title menu picture in a

case where the type of the optical discs currently reproduced corresponds to DVD series, and selecting and reproducing any one of the A/V data of the main titles recorded in the DVD or selecting and instantly reproducing any one of the A/V data of the title corresponding to a movie or music.

[CONSTRUCTION OF THE INVENTION]

To achieve the above objects, an optical disc reproduction method according to the present invention includes a first step of repeatedly performing an all disc repetition play operation with plural optical discs seated in a multi-disc changer; a second step of identifying the type of an optical disc to be currently played while the all disc repetition play operation is performed; and a step of omitting a still operation according to navigation information of a DVD and reproducing A/V data corresponding to at least one or more title recorded in the DVD in a case where the identified type of the optical disc is the DVD.

Further, an optical disc reproduction method according to the present invention includes a first step of repeatedly performing an all disc repetition play operation with plural optical discs seated in a multi-disc changer; a second step of identifying the type of an optical disc to be currently played while the all disc repetition play operation is performed; a third step of selecting A/V data

of any one title with the longest data length among titles recorded in a DVD according to navigation information of the DVD in a case where the identified type of the optical disc is the DVD; and a fourth step of reproducing the selected A/V data of the title.

Further, an optical disc reproduction method according to the present invention includes a first step of identifying the type of an optical disc to be reproduced when an all disc repeat play mode is set in a multi-disc changer under the condition that a plurality of optical discs including the specific optical disc are loaded in the multi-disc changer, the changer being adapted to wait at a menu picture before or after DVD reproduction in a general play mode; if the identified optical disc type corresponds to a DVD, a second step of forcibly reproducing titles recorded on the DVD on the basis of navigation information of the DVD; and a third step of terminating the reproduction of the DVD by force if the title reproduction is completed.

Further, an optical disc reproduction method according to the present invention includes a first step of determining the type of an optical disc seated in a device; a second step of reading navigation information of the optical disc in a case where the determined type of the optical disc is an optical disc that may have plural

titles; a third step of detecting the data length of each title based on the read navigation information; and a fourth step of selecting and reproducing any one title among the titles recorded in the optical disc with reference to the detected data length.

Further, an optical disc reproduction method according to the present invention includes a first step of receiving a request of a successive play operation of plural optical discs seated in a device; a second step of identifying the type of an optical disc to be currently reproduced among the plural optical discs; a third step of reading navigation information of the optical disc in a case where the identified type is an optical disc having plural titles; a fourth step of detecting the data length of each title based on the navigation information; and a fifth step of selecting and reproducing any one of the plural titles with reference to the detected data length.

Hereinafter, preferred embodiments of an optical disc reproduction method according to the present invention will be described in detail with reference to accompanying drawings.

Fig. 3 is a flowchart illustrating an optical disc reproduction method according to the present invention.

First, a plurality of optical discs are seated respectively in the slots of the multi-tray 10 of the

multi-disc changer constructed as described previously with reference to Fig. 1 (S10). If a user requests playback of the optical disc in a specific slot, then the VDP system 40 identifies a number of the specific slot and controls the servo system 20 to rotate the multi-tray for the optical disc to be located at a position readable by the optical pickup 30.

The VDP system 40 then performs a reproduction operation of processing an RF signal read by the optical pickup 30 and outputting the resulting signal to an external device, such as a television set or audio set (S11).

On the other hand, in the case where the user requests an 'all disc repeat play' operation' operation (S12), the VDP system 40 identifies the type of the optical disc seated in, for example, the first slot 101 of the multi-tray 10 (S13). If the identified type of the optical disc is a DVD series optical disc, for example, a DVD-ROM (S14), the DVD is identified through disc type information Disc-Type information recorded in a lead-in area LIA of the DVD-ROM or through the process of a focus servo operation. Thereafter, navigation information in the data area, for example, video management information VMGI is read and downloaded to the device (S15).

The VDP system 40 then retrieves and identifies a

start address of each title Title_Start_Address included in the downloaded navigation information, so that it omits a typical initial operation of outputting and displaying a DVD title menu picture in a still mode as stated previously with reference to Fig. 2 (S16).

As shown in Fig. 4, the VDP system 40 also selects any one title with the longest playback time from among a plurality of titles recorded in the data area as a main title with reference to the start address of each title in the navigation information, and reproduces only A/V data corresponding to the main title by force. If the reproduction of the main title is completed, then the VDP system 40 terminates the reproduction of the DVD by force so that the menu picture might not be displayed in the still mode (S17).

As an alternative, where content type information for each title Title_Content_Type is included in the navigation information, the VDP system 40 can select and reproduce only a title other than titles such as an advertisement, a production note, etc., for example, a title of A/V data corresponding to a movie or music.

On the other hand, where the identified optical disc type is not a DVD-series optical disc type, but, for example, a CD-series optical disc type, the VDP system 40 performs a typical play operation (S18).

Thereafter, upon receiving the user's request to stop the all disc repeat play operation (S19), the VDP system 40 identifies the current operation mode, that is, the type of the optical disc seated in the next slot, and stops the series of the repeated reproduction operations of repeatedly performing the steps S14 to S18 according to the type of the optical disc (S20). On the other hand, the VDP system 40 controls the servo system 20 to successively and repeatedly perform the series of operations of identifying the type of the optical disc seated in the next slot if the user makes no request to stop the all disc repeat play operation (S21).

In the meanwhile, the operation of instantly reproducing the main title recorded in the optical disc as described above may apply to a general DVD player including only one slot as shown in Fig. 5. There will be described a specific embodiment of selecting a main title with the longest data length among plural titles recorded in the DVD.

Figs. 6 to 8 show navigation information used for an optical disc reproduction method according to the present invention.

Navigation information read from the optical disc, such as a DVD, includes, as shown in Fig. 6, a title search pointer table TT_SRPT including title search pointer table information TT_SRPTI and title search

pointers for respective titles TT_SRP #1 ~ TT_SRP #n.

The title search pointer table information includes the number of the title search pointers TT_SRP_Ns and an end address of the title search pointer table TT_SRPT_EA. The title search pointers each include a title playback type TT_PB_TY, the number of angles AGL_Ns and a start address of a video title set VTS_SA.

The navigation information further includes, as shown in Fig. 7, a video title set program chain information table VTS_PGCIT. The video title set program chain information table includes video title set program chain information table information VTS_PGCITI, a plurality of video title set program chain information search pointers VTS_PGCI_SRP #1 ~ VTS_PGCI_SRP #n and a plurality of video title set program chain information VTS_PGCI #1 ~ VTS_PGCI #n.

The navigation information further includes, as shown in Fig. 8, program chain general information PGC_GI. The program chain general information includes a program chain playback time PGC_PB_TM and a program chain navigation control information PGC_Navigation Control.

The VDP system 40, which is provided in a multi-disc changer or an optical disc apparatus such as a general DVD player, is adapted to select and reproduce a main title with a longest playback time recorded on the DVD

with reference to the DVD navigation information including the various information as described above.

For example, the VDP system 40 detects the number of titles recorded on the DVD by referring to the number of title search pointers TT_SRP_Ns included in the title search pointer table information TT_SRPTI as stated previously with reference to Fig. 6. Further, by referring to a start address of a video title set VTS_SA included in each of the title search pointers TT_SRP #1 ~ TT_SRP #n as stated previously with reference to Fig. 3, the VDP system 40 retrieves video title set information VTS_Information (VTSI) including management information for each video title set.

Note that a plurality of video titles may exist in each video title set VTS. In this connection, the VDP system 40 detects the number of titles included in each video title set and a program chain for each title associated with each video title set by referring to the video title set program chain information table information VTS_PGCITI included in the video title set program chain information table VTS_PGCIT as stated previously with reference to Fig. 7.

Then, the VDP system 40 retrieves and identifies a program chain playback time PGC_PB_TM as stated previously with reference to Fig. 8, retrieves the next

program chain by referring to the program chain navigation control information PGC_Navigation Control as stated previously with reference to Fig. 5, and accumulates a playback time PGC_PB_TM of the retrieved next program chain. When the next program chain number Next_PGCN of the program chain navigation control information becomes the last program chain number Last_PGCN, the VDP system 40 obtains the playback time accumulated up to that time as a playback time length, or data length, of the current title.

After performing the foregoing operation with respect to all the titles, the VDP system 40 selects and reproduces any one of the titles having the longest playback time as a main title.

For reference, in the case of identifying the type of an optical disc corresponding to the DVD series under the condition that a user requests the 'all disc repeat play' operation, as stated above, the VDP system may perform a series of operations of identifying the type of an optical disc seated in the next slot, while omitting a reproduction operation for the DVD-series optical disc. In this case, there is a problem in that the VDP system cannot reproduce a title recorded on the DVD-series optical disc.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes,

those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Further, in an optical disc apparatus such as a general DVD player where only one DVD is loaded, the VDP system instantly reproduces and outputs a main title in the above manner if an 'instant play mode' is set by a user, but outputs and displays a typical menu picture as a still picture if a general play mode is set by a user.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

[Effect of the Invention]

The optical disc reproduction method according to the present invention, which is configured as described above, may omit the still mode operation of displaying the DVD title menu picture in the case where the type of the optical disc to be currently reproduced is a DVD-series disc when the all disc repeat play is performed with respect to the plural optical discs seated in the multi-disc changer or an instant reproduction operation is

performed in a general optical disc player, select and reproduce any one of A/V data of the main title recorded in the DVD, and select and reproduce any one of A/V data of the title corresponding to a move or music to instantly reproduce and output it, thus making it possible to effectively prevent the instant play operation or the all disc repeat play operation requested by the user from being temporarily stopped by a menu screen display.

[CLAIMS]

[Claim 1]

An optical disc reproduction method comprising:

a first step of performing an all disc repetition play operation with plural optical discs seated in a multi-disc changer;

a second step of identifying the type of an optical disc to be currently played while the all disc repetition play operation is performed; and

a step of omitting a still operation according to navigation information of a DVD and reproducing A/V data corresponding to at least one or more title recorded in the DVD in a case where the identified type of the optical disc is the DVD.

[Claim 2]

The optical disc reproduction method of claim 1, wherein
the third step includes omitting an initial user menu output operation according to navigation information of the DVD.

[Claim 3]

The optical disc reproduction method of claim 1, wherein

the third step includes selecting and reproducing only the A/V data of any one title with the longest data length among titles recorded in the DVD.

[Claim 4]

The optical disc reproduction method of claim 1, wherein

the third step includes selecting and reproducing only the titles of A/V data corresponding to a movie or music among titles recorded in the DVD.

[Claim 5]

An optical disc reproduction method comprising:

a first step of performing an all disc repetition play operation with plural optical discs seated in a multi-disc changer;

a second step of identifying the type of an optical disc to be currently played while the all disc repetition play operation is performed;

a third step of selecting A/V data of any one title with the longest data length among titles recorded in a DVD according to navigation information of the DVD in a case where the identified type of the optical disc is the DVD; and

a fourth step of reproducing the selected A/V data of

the title.

[Claim 6]

An optical disc reproduction method comprising:

a first step of identifying the type of an optical disc to be reproduced when an all disc repeat play mode is set in a multi-disc changer under the condition that a plurality of optical discs including the specific optical disc are loaded in the multi-disc changer, the changer being adapted to wait at a menu picture before or after DVD reproduction in a general play mode;

if the identified optical disc type corresponds to a DVD, a second step of forcibly reproducing titles recorded on the DVD on the basis of navigation information of the DVD; and

a third step of terminating the reproduction of the DVD by force if the title reproduction is completed.

[Claim 7]

The optical disc reproduction method of claim 6, wherein

the forcible reproduction and termination are performed by omitting the operation of waiting at the menu picture before or after the DVD reproduction.

[Claim 8]

The optical disc reproduction method of claim 6,
wherein

the first step includes selecting and forcibly
reproducing a title with a longest playback time among
the titles recorded on the DVD.

[Claim 9]

An optical disc reproduction method comprising:

a first step of determining the type of an optical
disc seated in a device;

a second step of reading navigation information of
the optical disc in a case where the determined type of the
optical disc is an optical disc that may have plural
titles;

a third step of detecting the data length of each
title based on the read navigation information; and

a fourth step of selecting and reproducing any one
title among the titles recorded in the optical disc with
reference to the detected data length.

[Claim 10]

The optical disc reproduction method of claim 9,
wherein

the optical disc that may have the plural titles is a

DVD.

[Claim 11]

The optical disc reproduction method of claim 9,
wherein

the navigation information includes information
about the number of the titles, information about
respective start addresses of the titles and information
about the respective data length of the titles.

[Claim 12]

The optical disc reproduction method of claim 11,
wherein

the titles each include video data stored separately
in predetermined units;

the navigation information further includes
information about playback orders of the video data and
information about playback times of the video data
together, wherein in the third step the data length of
each title is detected as the sum of the playback times.

[Claim 13]

The optical disc reproduction method of claim 9,
wherein

the first to fourth steps are performed when a user

selects an instant play mode in a title menu.

[Claim 14]

The optical disc reproduction method of claim 9,
wherein

the fourth step includes selecting and reproducing a
title with the longest data length among the detected data
lengths.

[Claim 15]

An optical disc reproduction method comprising:

a first step of receiving a request of a successive
play operation of plural optical discs seated in a device;

a second step of identifying the type of an optical
disc to be currently reproduced among the plural optical
discs;

a third step of reading navigation information of the
optical disc in a case where the identified type is an
optical disc having plural titles;

a fourth step of detecting the data length of each
title based on the navigation information; and

a fifth step of selecting and reproducing any one of
the plural titles with reference to the detected data
length.

[Claim 16]

The optical disc reproduction method of claim 15,
wherein

the fifth step includes selecting and reproducing a
title with the longest data length among the detected data
lengths.

[Claim 17]

The optical disc reproduction method of claim 16,
wherein

the optical disc having the plural titles is a DVD.

[Claim 18]

The optical disc reproduction method of claim 15,
wherein

the titles each include video data stored separately
in predetermined units;

the navigation information further includes
information about playback orders of the video data and
information about playback times of the video data
together, wherein in the fourth step the data length of
each title is detected as the sum of the playback times.

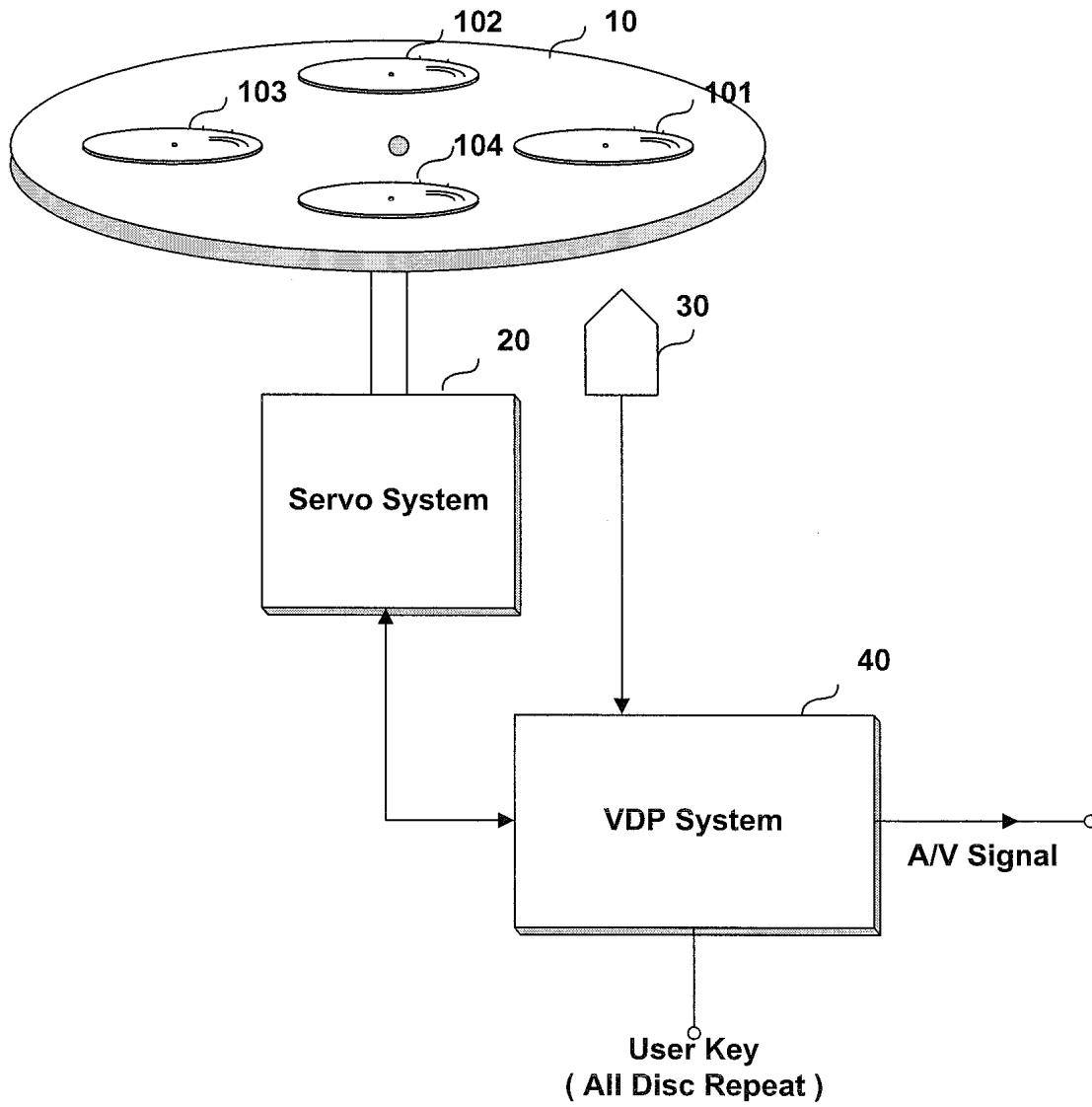
[Claim 19]

The optical disc reproduction method of claim 15,

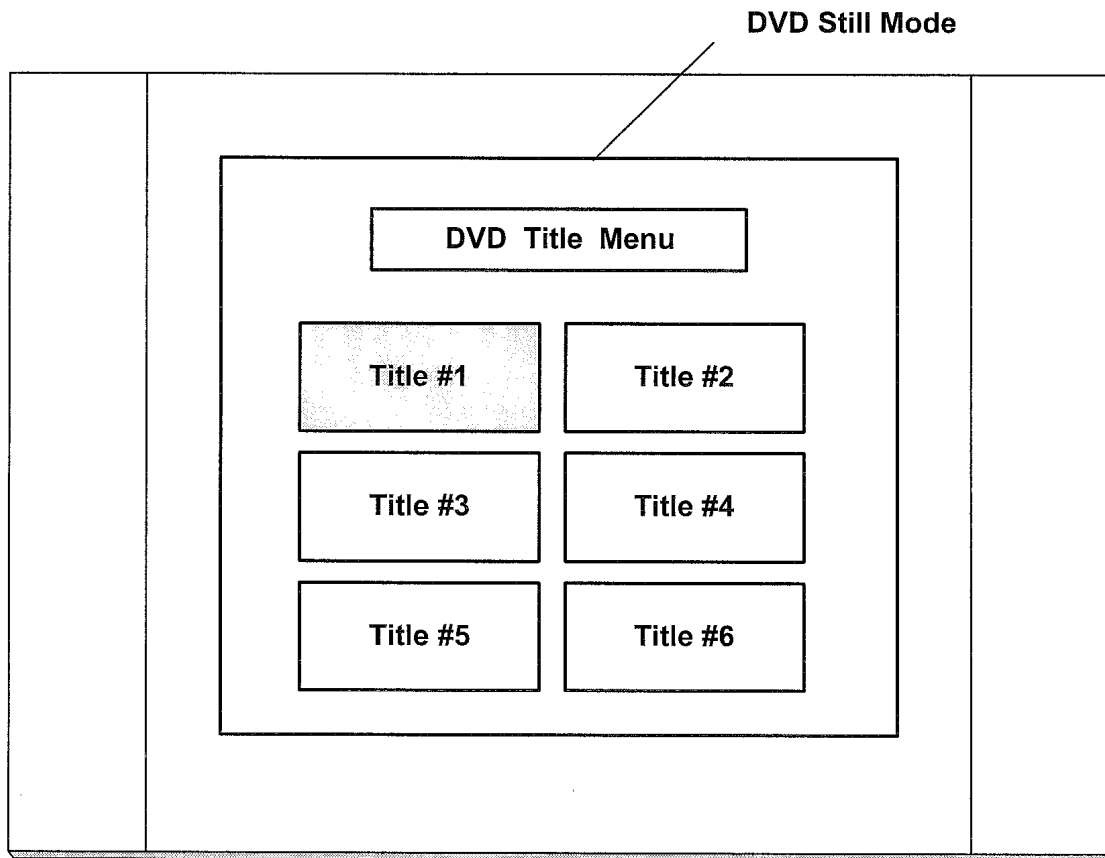
further comprising:

a step of successively reproducing a next one of the plurality of discs if the reproduction of the specific disc is completed.

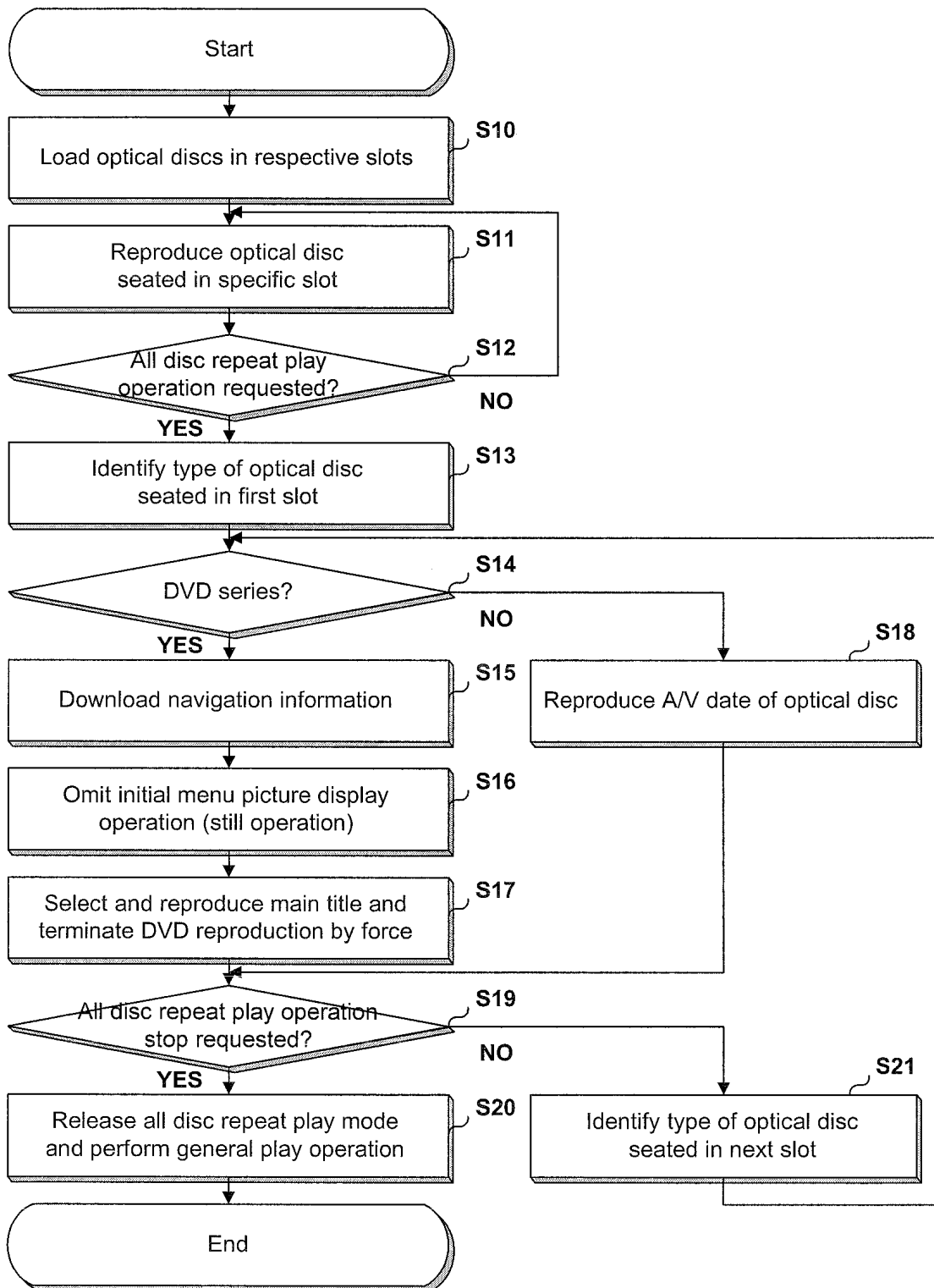
[Figure 1]



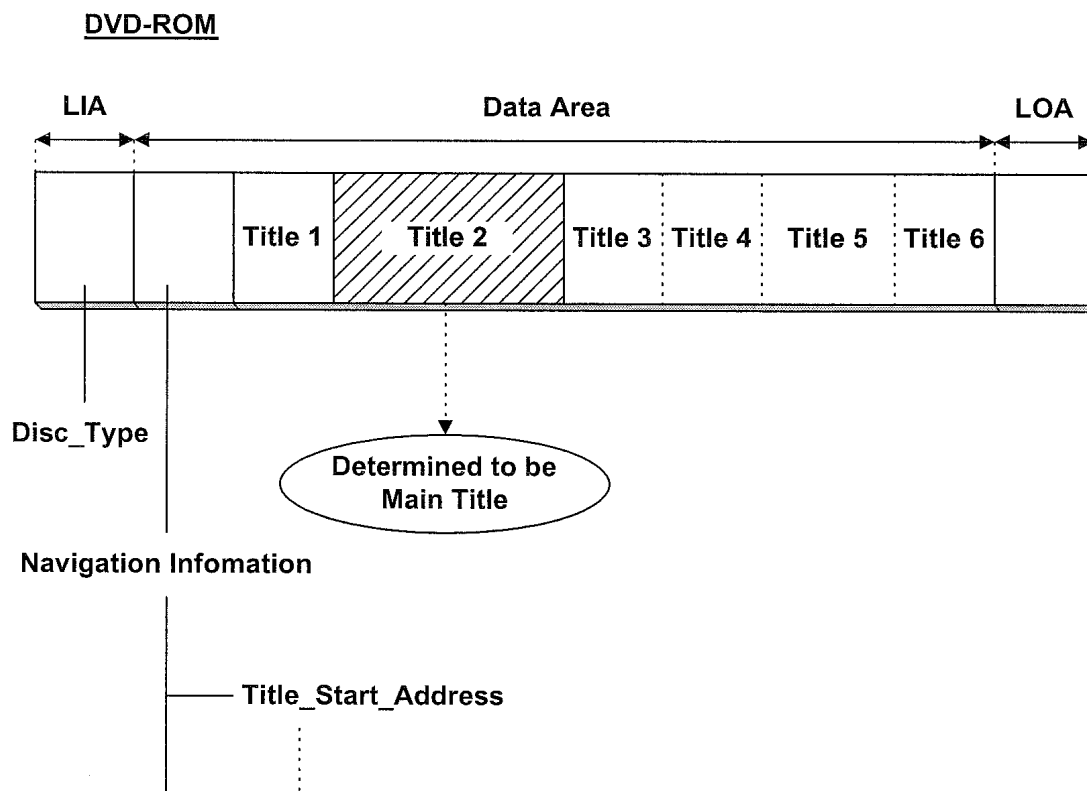
[Figure 2]



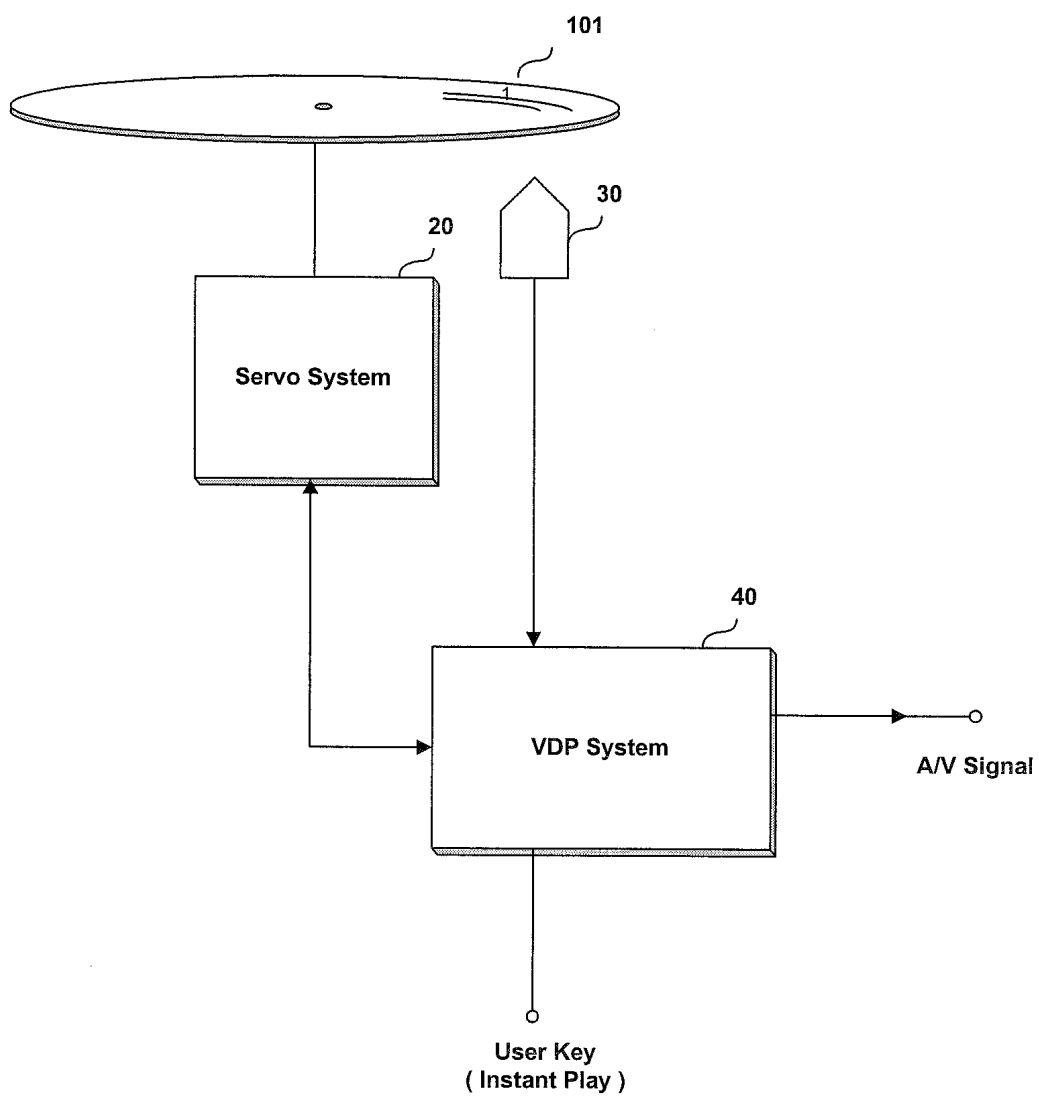
[Figure 3]



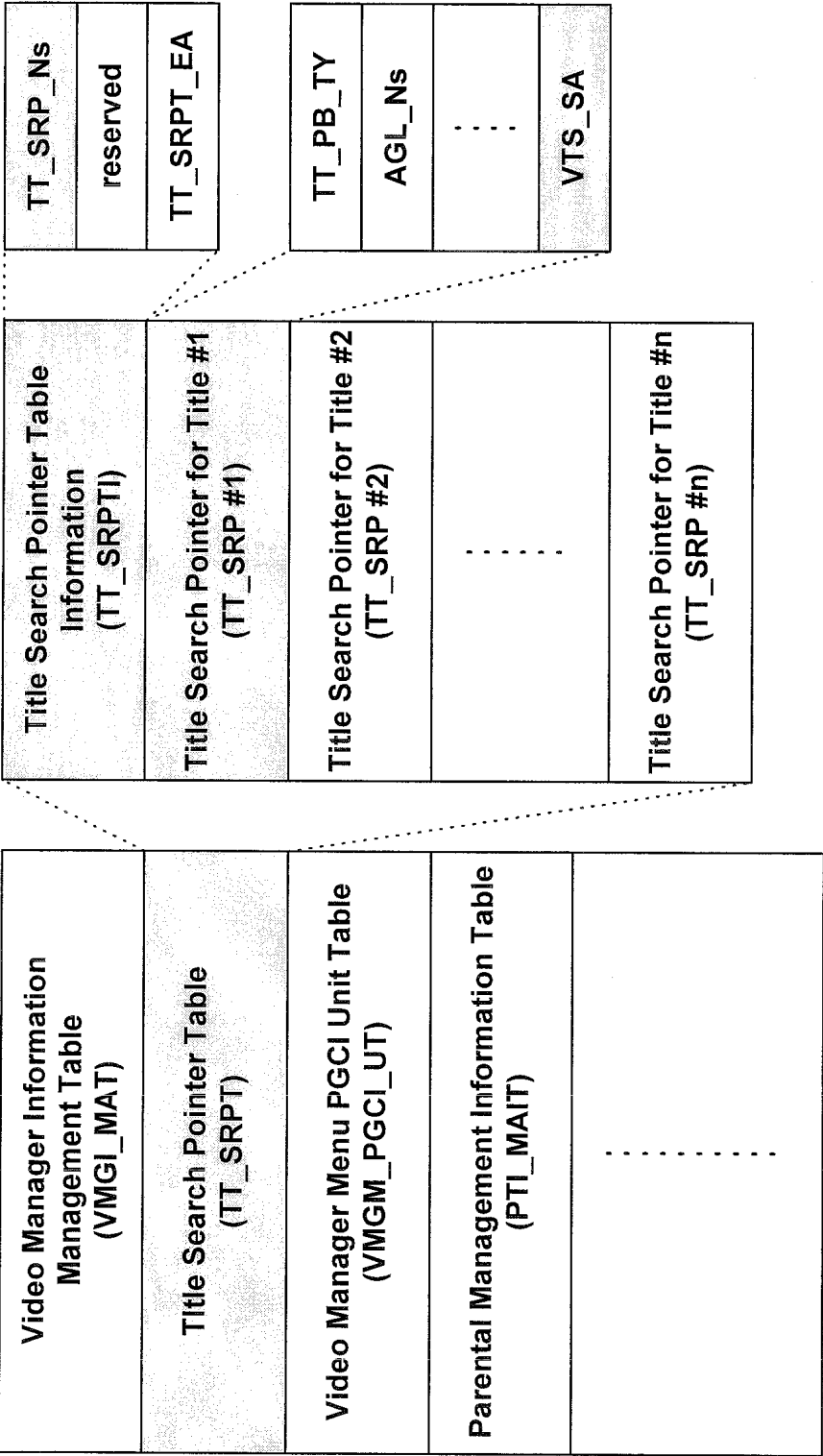
[Figure 4]



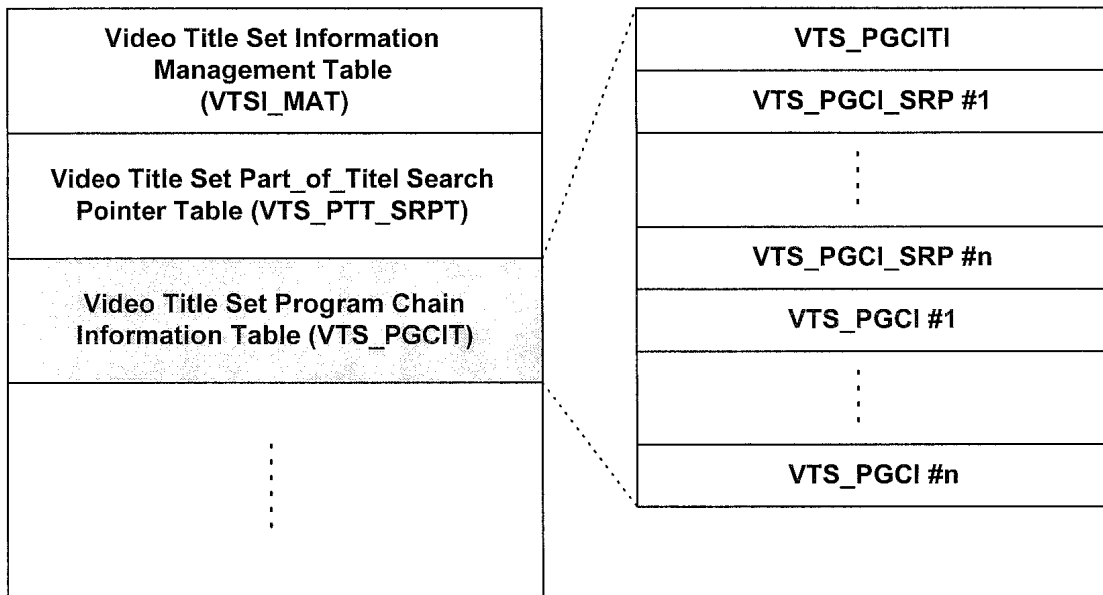
[Figure 5]



[Figure 6]



[Figure 7]



[Figure 8]

